

The American FERTILIZER

All Fertilizer and Feeding Materials



1850—1947

POTASH SALTS
SULPHATE *of* AMMONIA
NITRATE *of* SODA
NITROGANIC TANKAGE
(Activated Sludge)
DEFLUORINATED PHOSPHATE

Importers

Exporters

PERUVIAN BIRD GUANO, FISH MEAL
BONE MEAL, TANKAGE, BLOOD
NITROGENOUS

97 Years of Service

H. J. BAKER & BRO.

271 Madison Avenue, New York

BALTIMORE

•

CHICAGO

•

SAVANNAH

•

BUENOS AIRES

FOOD FOR THOUGHT...

1946 was a year when America's fame topped all previous records . . . a year when America's farms supplied the vitally needed food for a famine-stricken world.

A proud record . . . but impossible without the fertile soil which brought forth such abundance.

Fertilizers, many of them compounded with potash, are a prime necessity for enriching the land. For potash increases fertility . . . helps ward off disease and drought . . . adds to the yield of the land. Sunshine State Potash will continue its part in producing the abundance which is America . . . in **1947**



Reg. U. S. Pat. Off.

HIGRADE
MURIATE OF POTASH
62/63% K₂O

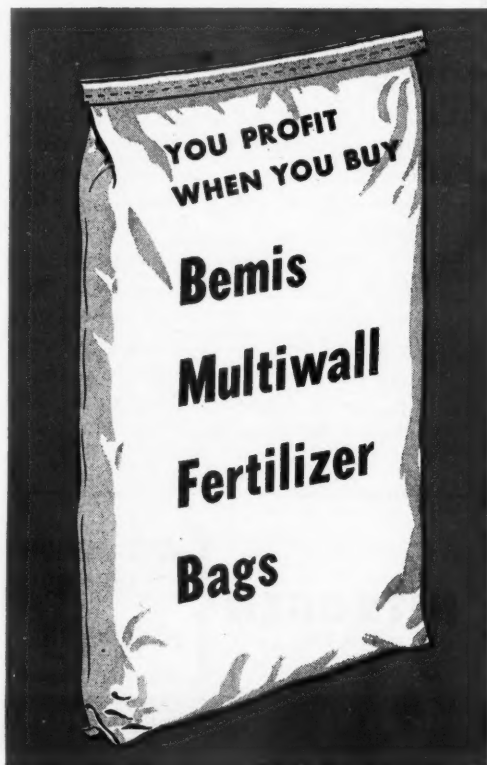
GRANULAR
MURIATE OF POTASH
48/52% K₂O

MANURE SALTS
22/26% K₂O

UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

Published every other Saturday. Annual subscription: in the United States, \$3.00; Canada and Mexico, \$4.00; other countries, \$5.00. Entered as second-class matter, January 15 1910, at the Post Office at Philadelphia, Pa., under Act of March 3, 1879. Registered in United States Patent Office. Publication office, 1900 Chestnut St., Phila., 3 Pa.

are you getting
the advantages of
BEMIS
MULTIWALL
SERVICE?



What Bemis facilities can do for you in service is as important as the top quality you get in Bemis Multiwall Bags.

Bemis' 6 multiwall plants and 28 offices are located to give you close-to-source contact.

Bemis multiwall specialists are available to help you with plant layout and bag filling, closing, and storage problems.

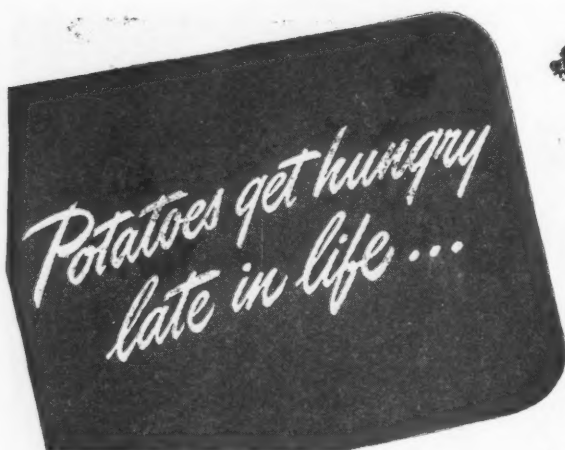
That's why it's good business to have "The Bemis Habit."

BEMIS BRO. BAG CO.

Peoria, Ill. • East Pepperell, Mass. • Mobile, Ala.
San Francisco, Calif. • St. Helens, Ore. • Wilmington, Calif.



Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte
Chicago • Denver • Detroit • Houston • Indianapolis • Memphis
Kansas City • Los Angeles • Louisville • Minneapolis
New Orleans • New York City • Norfolk • Oklahoma City
Omaha • Orlando • Pittsburgh • St. Louis • Salina • Seattle
Salt Lake City • Wichita

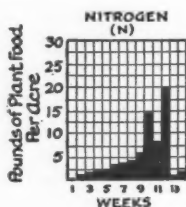


IT ISN'T until late in the growing season that potatoes take up most of their plant food. But then they really go to town.

In tests run at the Virginia Truck Experiment Station, potatoes required less nitrogen during the first half of their growing season—and took up only 9 per cent of their total plant food.

But, during the 10th, 11th and 12th weeks—only 3 weeks out of their 14-week growing period—they absorbed 69% of the total nitrogen.

That's why potatoes need a fertilizer whose nitrogen resists leaching for over two months and then is readily available in large quantities—for potatoes get hungry late in life.



Your fertilizer fits the crop when you use Urea Nitrogen

Urea nitrogen has a way of saving itself for the time when crops need it most—late in the growing season. This is due to chemical changes in the soil that make Urea Nitrogen resistant to leaching yet readily available to the plants.

Du Pont UREA-AMMONIA LIQUORS provide an excellent, low-cost source of urea-nitrogen for making mixtures that store well, drill well, and have low acid-reaction.

To meet the varying requirements of manufacturers, Du Pont supplies four UREA-AMMONIA LIQUORS and URAMON Fertilizer Compound. For further information, write E. I. du Pont de Nemours & Co. (Inc.), Ammonia Department, Wilmington 98, Delaware.

NITROGEN THAT FITS THE CROP

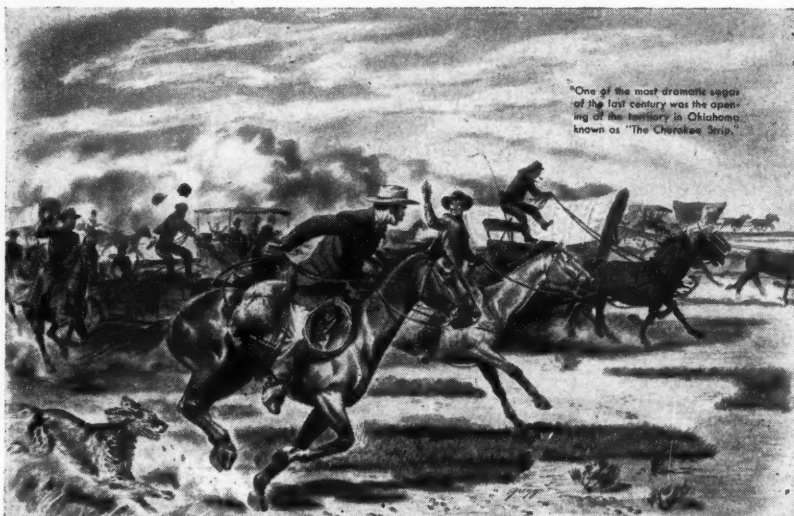
DU PONT UREA NITROGEN



REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

**UREA-AMMONIA
LIQUORS
•
URAMON
REG. U.S. PAT. OFF.
Fertilizer Compound**



46 Years *Before* the Cherokee Strip* . . .

CHASE is manufacturing Better Bags

• At dawn, September 16, 1893, hundreds on horseback, in wagons, and afoot, raced to stake claims in Oklahoma. And many prospective landowners carried precious seed, feed, equipment and supplies in Chase bags.

This year Chase is celebrating 100 years in the bag business. The lessons learned throughout this long experience have been translated into better materials, finer construction, improved manufacturing processes—a more efficient container for *your* product.

Furthermore, Chase makes bags of all kinds: cotton, burlap, paper, combination paper and cotton, combination paper and burlap, and open mesh. Thus you are assured of impartial advice on the right bag for the specific need . . . whether it be feed, flour, seed, citrus fruit, produce, dry or wet chemical, fertilizer or building material—*whatever* your product may be.

Your Chase salesman will be glad to give complete details on any Chase product. Write today.



One Hundred Years of Experience
in Making Better Bags for
Industry and Agriculture.

FOR BETTER BAGS . . . BETTER BUY CHASE

CHASE BAG CO. GENERAL SALES OFFICES, 309 WEST JACKSON BLVD., CHICAGO 6, ILL.

SALT LAKE CITY • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • ORLANDO, FLA. • BOISE • DALLAS • OKLAHOMA CITY
PORTLAND, ORE. • CROSSETT, ARK. • NEW ORLEANS • REIDSVILLE, N. C. • HARTUNG, TEXAS • CHAGRIN FALLS, O. • HUTCHINSON, KAN.



OPEN MESH BAGS



**PROTEX, MULTIWALL
AND OTHER PAPER BAGS**

TOPMILL BURLAP BAGS





**COTTON BAGS
FOR ALL NEEDS**

SPECIALTIES



-How SPENCER Helps You Sell More **SPENSOL**

SPENCER NITROGEN SOLUTIONS

To help you develop new markets for SPENSOL, the new low-cost nitrogen fertilizer mixing... here is the first of a series of Farm Paper advertisements for 1947, selling the vital need for High Nitrogen fertilizer to

2,000,000
FARMERS



ARE YOU CHEATING
Mother Earth
?

Four out of every five farmers are. And cheating themselves at the same time. Because they have been forced to take more from their land than they put back.

Land—whether it's upland or lowland, poor land or rich land—must have nitrogen. And the large yields of crops America has been producing have taken their toll of nitrogen from the soil—millions of tons every year. Only a fraction, a very small fraction, has been replaced.

There wasn't the time to raise the usual legumes. Too slow. And commercial nitrogen fertilizer was not available.

Today, the picture is changing. Adequate supplies of Spencer's Nitrogen Fertilizer Products will soon be plentiful. And economical. Then, every American farmer can pay his debt to Mother Earth... help restore the fertility of his land... and be rewarded with increased yields from his crops.

In order to answer many of your questions concerning the benefits, the advantages, and the proper use of Spencer's New Leaflets about Spencer's fertilizer is yours for the asking.

FREE



Spencer Chemical
COMPANY

Manufacturers of NITROGEN Fertilizer Products
General and Sales Offices:
Dwight Building, Kansas City 6, Missouri
Works: Pittsburg, Kansas

SPENCER CHEMICAL COMPANY
NITROGEN DIVISION
Dwight Bldg. Kansas City 6, Mo.
Send me a free copy of your new Leaflet about nitrogen.
Name.....
Title.....
Firm.....
City.....
State.....
E.E.D.

COMPOSITION OF SPENSOL (SPENCER NITROGEN SOLUTIONS)

	Ammonium Nitrate %	Anhydrous Ammonia %	Water %	Total Nitrogen %	Nitrate Nitrogen %	Ammonia Nitrogen %
SPENSOL A	65.0	21.7	13.3	40.6	11.36	29.24
SPENSOL B	55.5	26.0	18.5	40.8	9.62	31.18
SPENSOL C	66.8	16.6	16.6	37.0	11.65	25.35

✓ Higher Nitrogen Content
✓ Easier Mixing

✓ More Nitrogen Per Dollar
✓ Immediate Availability

Spencer Chemical
COMPANY



General and Sales Offices: Dwight Building, Kansas City 6, Missouri

Works: Pittsburg, Kansas

Manufacturers of NITROGEN Fertilizer Products

The American FERTILIZER

Vol. 106

JANUARY 11, 1947

No. 1

World Soil and Fertilizer Resources in Relation to Food Needs*

By ROBERT M. SALTER

*Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering,
Agricultural Research Administration, U. S. Department of Agriculture.*

Hunger and starvation have stalked the footsteps of man since the dawn of history. Only with the bloom of modern science in the last half-century has there come, for the first time, hope that these gaunt spectres could at last be banished, if man but willed it so. Through the centuries those in positions of leadership have been prone to accept the misery of hunger as an unavoidable fact of life, the result of population pressure on a limited food supply.

In the midst of the most destructive war in history, the leaders of the Allied Nations determined that one of the goals of victory should be *freedom from want*. To some, science appears to offer a basis of fact for this ideal. Here, in our own country, farmers applied the results of agricultural research so efficiently during the war years that production of food crops—despite many difficulties—reached and held an unprecedented peak. And it seems reasonable that with the peace, benefits of agricultural research might be still further extended, and that all the people of the world might possibly be better fed.

The high ideals that came with the fervor of the war are now being reconsidered and evaluated coolly in the light of peace-time realities. The peoples of the warring nations are determined to be practical. With skeptical

minds they are asking: Is it, after all, reasonable to hope that the world can produce enough to feed all its human inhabitants? Can the world's soil grow all the crops that would be needed? Are fertilizer sources great enough? Do we have the technology and management ability to produce the crops and maintain the soils?

These questions do not encompass the whole problem by any means, but these are the questions I am asked here today. I am glad to try to answer them, for I am convinced that we do have the soils we need, we do have the fertilizer resources, we have available the management ability, and we could produce enough food for all.

But how much is enough? We have an answer suitable for our purpose from the recent "World Food Survey" made by the Food and Agriculture Organization of the United Nations. By 1960, if everyone is to have an adequate diet, the world will need, according to the estimates of this survey, the following increases beyond pre-war production: Cereals, 21 per cent; roots and tubers, 27 per cent; sugar, 12 per cent; fats and oils, 34 per cent; pulses and nuts, 80 per cent; fruits and vegetables, 163 per cent; meats 46 per cent; and milk, 100 per cent.

Considering only the natural physical resources needed to obtain these increases in food production, and with acute awareness of many other problems involved, there are two obvious courses we can follow in seeking higher

*An address before the American Association for the Advancement of Science, Boston, Mass., December 30, 1946.

food production the world over. First, and perhaps as the easier course, we could obtain much of the increase through more intensive and more efficient use of the land now farmed. Second, with our knowledge of world soil types, we could expand production in the areas having undeveloped soil resources. I shall discuss these two courses separately and in the order named.

More Intensive Cultivation

Some of the possibilities of intensive and efficient production are readily evident in our own war experiences. Production of food crops was maintained at about 35 per cent above the period 1935-39. Admittedly, weather was more favorable in the war years than during the pre-war years, but even so with no more favorable weather the production would have been 20 per cent greater, despite the fact that the labor force was actually 6 per cent smaller.

Our experiment stations and our more successful farmers provide many illustrations of the opportunity for increasing food crop yields and animal production, if these improved agricultural techniques were more widely applied. Thus, the limiting factors to increased production seem to be lack of education and lack of capital rather than any limits of physical production capacity. For example, recent experiments on corn culture in the Southeast under ordinary farm conditions show that corn yields for that area can be more than doubled by a combination of improved practices. In addition to regular fertilization practices, these include heavy nitrogen treatment combined with the growing of adapted hybrids, closer spacing to take advantage of heavier fertilization, and early and shallow cultivation for weed control. By 1960, perhaps, 50-bushel-per-acre corn production in the Southeast will be the rule rather than the exception as today.

This, and many other examples, would indicate also that the estimates of production possibilities after the war, under prosperity conditions, made cooperatively by the United States Department of Agriculture and the Land Grant Colleges, are really conservative, though they may appear somewhat optimistic. This study estimated that there can be readily attained by 1950 appreciable increases in production per acre of most of our principal crops, over that obtained in the 1935-39 period. These estimated increases were as follows: Corn, 31 per cent; hay, 28 per cent; wheat 18 per cent; rice, 13 per cent; peanuts, 20 per cent; sugar beets, 17 per cent; potatoes, 22 per cent; and sweet potatoes, 31 per cent.

But the United States alone cannot feed the hungry of the world. We must look to other countries also to intensify food production, preferably in the food-deficit areas. Europe, with the exception of Poland, Russia, and the Balkans, had reached a high degree of intensified farming in relation to its soil resources prior to the war. Significant increases in the more highly developed European countries are thus doubtful. If, however, we take into account yield increases readily attainable in different soil regions of the United States, we can safely predict yield increases in other countries that possess the same Great Soil

TABLE I

Estimated Attainable Increase in Yield Due to Improved Practices.

Crop	U. S. S. R.	
	Yield	
	1935-39 (bu.)	1960 (bu.)
Wheat.....	10.0	12.0
Rye.....	12.7	13.5
Corn.....	16.3	20.0
Oats.....	22.2	28.0
Barley.....	4.9	18.0
Sugar Beets.....	6.1 T	8.0 T
Potatoes.....	121.5	180.0

Crop	INDIA	
	Yield	
	1935-39 (bu.)	1960 (bu.)
Wheat.....	10.7	20.0
Rice.....	26.2	40.0
Corn.....	12.9	20.0
Barley.....	16.5	20.0
Peanuts.....	400.0 lbs.	600.0 lbs.

Crop	CHINA	
	Yield	
	1935-39 (bu.)	1960 (bu.)
Wheat.....	14.9	18.0
Rice.....	52.5	70.0
Corn.....	24.2	35.0
Barley.....	21.8	24.0
Peanuts.....	769.0 lbs.	1,000.0 lbs.
Soybeans.....	16.8	20.0
Dry Beans.....	730.0 lbs.	1,000.0 lbs.
Potatoes.....	100.0	150.0

Crop	UNITED STATES	
	Yield	
	1937-41 (bu.)	1950 (bu.)
Corn.....	28.1	36.7
Oats.....	31.7	38.5
Hay.....	1.4 T	1.8 T
Potatoes.....	124.0	152.0
Soybeans.....	18.5	21.9
Peanuts.....	765.0 lbs	916.0 lbs
Wheat.....	12.4	14.6
Rice.....	47.5	53.6

Groups. In Table I we have such predictions for China, India, and the Soviet Union, the world's three most populous countries. These predictions take into account the present reported average yields in these countries and also the general intensity of present cropping practices, insofar as they are known. Yield increases considered attainable in these countries by 1960 are substantially equivalent to those considered attainable in the United States by 1950, as reported in the U. S. Department of Agriculture's Miscellaneous Publication No. 593, "Peace-time Adjustments in Farming."

It is impossible with the data available to make predictions on possible production increases by individual crops the world over, because acreage, yield, and production of many important crops are not reported by all countries. Also, much of the world's food supply comes from animal products and the efficiency of this production in different countries is not known. But we can estimate probable increase in world production of the eight principal classes of food, by applying to each class the percentage increases of about the same magnitude of those thought attainable for principal crops in the United States by 1950. Thus, in Table II we have the estimated world food supply possible in 1960 as a result of more intensive and better farming methods on present crop land, compared with the supply needed in 1960 to give all the people of the world an adequate diet, as estimated in the FAO survey.

In arriving at these estimates it is necessary to assume that the total pre-war world food supply equaled pre-war food consumption. Pre-war world food supplies were, therefore, estimated by multiplying per capita consumption, as reported in the FAO survey, by world population. Larger percentage increases were

applied to roots and tubers and fruits and vegetables because of the apparent opportunity for greatly increasing yields of these crops by the generous use of fertilizers.

On the basis of these estimates, world food needs in 1960 could be met for sugar and for roots and tubers on existing crop land. The need for cereals could virtually be met. Production of all other classes of food would fall short of the need.

It should be borne in mind, however, that the increases assumed to be attainable on existing crop land are conservative. There seems little doubt that a general use of high rates of fertilization on soils that will respond, coupled with modern techniques of insect and disease control, a change in land use patterns, selection of best varieties, flood and erosion control, and the adoption of other lesser techniques would result in even larger increases.

New Land In Cultivation

There are even greater opportunities—but more difficulties perhaps—in increasing food production by bringing new lands into cultivation. At present only 7 to 10 per cent of the total world land area is cultivated. Except for some desert areas, perpetual snow and ice, tundra, and the most rugged mountains, there is virtually no limit to the amount of land that can be brought into cultivation, save the economic limits of costs and returns. When we consider the Great Soil Groups of the world and the relatively small extent to which some of them are already in cultivation these possibilities become more apparent.

Soil maps have been made of many parts of the world. During the past few years our Bureau has made serious attempts to assemble these into a series of maps of uniform nomen-

TABLE II
PRE-WAR FOOD PRODUCTION AND INCREASES ATTAINABLE FROM MORE INTENSIVE USE
OF PRESENT CROP LAND¹

	Cereals	Roots and tubers ²	Sugar	Fats and oils	Pulses and nuts	Fruits and vegetables ³	Meat	Milk
	(millions of metric tons)							
Pre-war production.....	300.4	153.2	30.0	15.2	36.2	156.3	65.6	150.2
Increase attainable from present crop land.....	20%	50%	15%	20%	20%	35%	20%	20%
Attainable production from present crop land.....	360.0	230.0	34.5	18.0	43.4	211.0	78.7	180.2
World food needs in 1960.....	363.5	194.5	33.6	20.4	65.2	411.0	95.8	300.0

¹For 70 countries including 90 per cent of world population. World consumption of each class of food as given in "World Food Survey" of FAO is assumed to equal world production.

²Include bananas.

³Include eggs and fish.

clature so that various regions can be compared, and to fill in unmapped portions through careful study of climatic, geological, and other relevant data. This research is in progress. Although uncompleted, it has given soil scientists an opportunity to arrive at a few preliminary judgments about our soil resources. A very small scale, exceedingly generalized map of the world, compiled some time ago, may be useful to indicate the location of the food soil area of the world. (Fig. 1.)

The snow and ice, tundra, mountains, and deserts total 48 per cent of the world land areas. We can assume that these areas have no practical possibilities for extension of agriculture. The Chernozem, Chestnut, Gray Forest, Podzol (including Gray-Brown podzolic), the Red soils of tropics and subtropics, and Alluvial soils occupy an estimated 52 per cent of the world land area. In this 52 per cent we can look for areas for expansion of agriculture. The Chernozem and Chestnut soils are now largely under cultivation, and no great expansion into new areas can be foreseen. Some reclamation of Alluvial soils, either by drainage or irrigation or both, should be possible in the tropics.

PRASSOLOV (PEDOLOGY, No. 2, 1946) ESTIMATES THE AREAS OF THE WORLD IN TEN BROAD CLASSES OF SOILS. HIS ESTIMATES ARE AS FOLLOWS:

Chernozems.....	}	6%
Chernozem soils of prairies.....		
Black soils of tropical regions.....		

Chestnut soils of dry steppes, (including Solonetz).....	}	7%
Gray Forest.....		
Brown Forest.....		
Slightly leached soils of dry forests....	}	7%
Alluvial soils, marshes, and swamps of tropical regions.....		
Podzols (including bogs).....		
Red soils of subtropics.....	}	19%
Reddish-brown soils of tropical savannas		
Red soils of tropical forests.....		
Lateritic soils.....	}	17%
Sierozems and other soils of desert steppes and oases (inc. Solonchaks)		
Sands and stony soils of the deserts....		
Mountain Tundra.....	}	16%
Mountain Meadows.....		
Mountain-forest Podzols.....		
Mountain-forest Brown Soils.....	}	4%
Mountain-forest Red soils.....		
Soils of mountain steppes.....		
High mountain deserts.....	}	11%
Tundra.....		
Everlasting snow and ice.....		

The Podzols of the northern temperate zone and the Red soils of the tropics and subtropics constitute the extensive soils onto which great expansion of food production might be possible. These soils occupy an estimated 28 per cent of the world land area, and probably less than 1 per cent is now under cultivation. It is

(Continued on page 26)

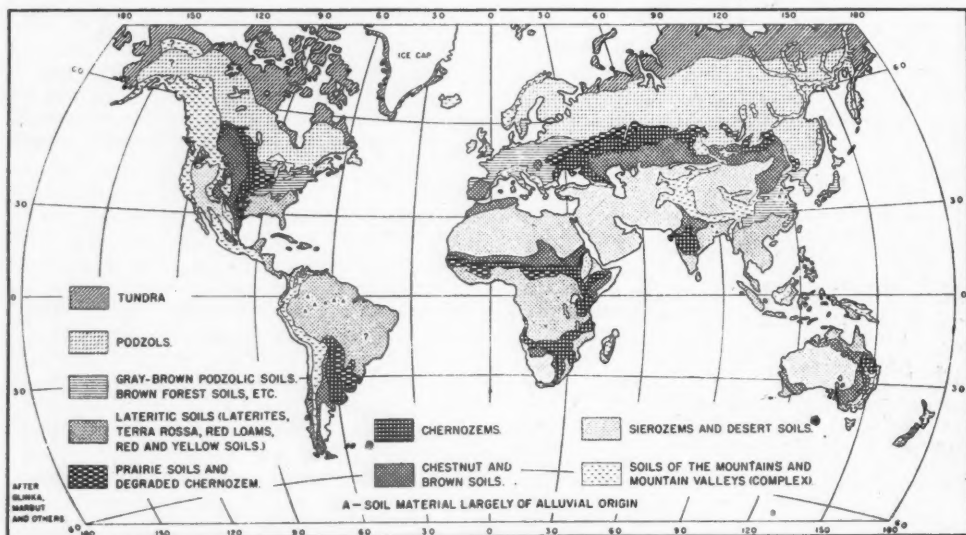


Fig. 1. Schematic Map of Important Soil Groups

International Reports Good Year

"In its first complete year of peace-time operations since 1941, International Minerals & Chemical Corporation has enjoyed a period of marked progress and accomplishment," Louis Ware, president of the company, said recently in a year-end review.

"Fortunately," he continued, "our business was not of a type that had to be re-gearred to peace-time operations following its tremendous production for war. Of course, during the war, we, like other forward looking industrial concerns, made plans to take up any post-war production slack which might occur, but we were confident that the broad educational work being done to make food producers conscious of the value of plant foods in increasing crop production would result in continued high consumption of fertilizer after the war. This confidence has been justified. Our potash, phosphate and fertilizer plants have been operating at full capacity in 1946 and we see no slackening of this activity in prospect during the coming year.

"In 1946 our company launched two of the largest construction projects in its history, the Noralyn phosphate plant near our Peace Valley mine at Bartow, Fla., and a \$3,000,000 amino products plant at San Jose, Calif. In addition, we completed construction of a superphosphate plant at Mason City, Iowa.

"The Florida and California plants will be completed during 1947, and we confidently expect to initiate other large construction projects this year to further add to the expansion of our entire operation.

"Present indications are for an unprecedented demand for phosphates, which completion of the Noralyn plant will help meet; and completion of the amino products plant at San Jose should give us a quantity of mono sodium glutamate to supply a demand that never before has been filled.

"We have recently established a wholly-owned subsidiary in England to represent us in the foreign export sales market, a phase of our business that was interrupted by the war but which can now be resumed.

"New financing initiated during 1946 has resulted in an increased number of stockholders and a broader distribution of our securities throughout the United States. Consequently, we have put a plan in force for regional stockholders meetings, and meetings we have held so far have been considered a valuable contribution to our stockholder relations," Mr. Ware concluded.

Captain Totman Returns

Captain James C. Totman, U.S.A.R., son of James E. Totman, president of the Summers Fertilizer Co., Inc., arrived on the *Queen Elizabeth*, New York, January 1st, with his bride, the former Monique Maljean, daughter of M. E. G. Maljean, head of the French Economic Commission to Austria. The marriage took place in Versailles, December 23rd. The couple will reside at Watkins Glen, New York, while Captain Totman completes his college training at Cornell, following which he will become associated with the Summers organization.

Effect of 2,4-D on Soil Micro-organisms

The widespread use of 2,4-dichlorophenoxyacetic acid as a weed killer makes it desirable to know more about its effect upon all kinds of organisms. Because most of the 2,4-D which is sprayed ultimately reaches the soil, it is especially desirable to know what effect it may have on the useful and harmful micro-organisms of the soil.

In the November, 1946, Michigan Agricultural Experiment Station Bulletin, Ralph W. Lewis and Charles L. Hamner report on experiments carried on by the station with several commercial preparations of 2,4-D weed killer. While saturated solutions containing up to 4,000 parts per million of 2,4-D inhibited the growth of some of the soil organisms, a concentration of 1,000 p.p.m. in no case had any harmful effect.

From this they conclude that "under normal rates of application for the killing of weeds, the amount of 2,4-D which reaches the soil will have no important effect on the soil micro-organisms or on plant pathogenes present in the soil."

Heavy Fertilization Pays

High fertilization is more profitable than low fertilization. This was revealed by experiments conducted by Michigan State College soil specialists. In experiments conducted to show the value of alfalfa as a soil builder when followed by other crops, such as corn and beets, part of the plots were fertilized with 1,000 pounds per acre of commercial fertilizer, and others with 400 pounds. The high fertilization produced an average of \$28.03 more cash returns per acre than the other, or \$16.06 above the cost of the extra 600 pounds of fertilizer.

THE AMERICAN FERTILIZER

ESTABLISHED 1894

PUBLISHED EVERY OTHER SATURDAY BY
WARE BROS. COMPANY
1900 CHESTNUT ST., PHILADELPHIA 3, PA.

A Magazine international in scope and circulation devoted
exclusively to the Commercial Fertilizer Industry and
its Allied Industries

PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

A. A. WARE, Editor
C. A. WHITTLE, Associate Editor
K. F. WARE Advertising Manager

E. A. HUNTER, Southern Advertising Manager
2246 E. Lake Road, N. E.,
Atlanta, Ga.

REPRESENTATIVE
WILLIAM G. CAMPBELL
125 W. Madison St., Chicago, Ill., Phone—Randolph 4780

ANNUAL SUBSCRIPTION RATES

U. S. and its possessions, also Cuba and Panama.....	\$3.00
Canada and Mexico.....	4.00
Other Foreign Countries.....	5.00
Single Copy.....	.25
Back Numbers.....	.50

THE AMERICAN FERTILIZER is not necessarily in accord with
opinions expressed in contributed articles that appear in its
columns. Copyright, 1946, by Ware Bros. Company.

Vol. 106 JANUARY 11, 1947 No. 1

Principal Articles in This Issue

WORLD SOIL AND FERTILIZER RESOURCES IN RELATION TO FOOD NEEDS, by Robert M. Salter.....	7
International Reports Good Year.....	11
Record Crop Yields in 1946.....	12
Beers Appointed Secretary of Mid-West Soil Improvement Committee.....	14
FERTILIZER MATERIALS MARKET	
New York.....	15
Philadelphia.....	15
Charleston.....	17
Chicago.....	19
Seed Bed Too Well Done Helps Weeds..	20
Use of Fertilizer Ups Apple Yields.....	22

Record Crop Yield In 1946

The total output of crops in 1946 is the greatest in the history of our country. High yields are primarily responsible, although the harvested acreage is fairly large, and the growing season has been more favorable than usual. The aggregate volume of crops is 26 per cent above the 1923-32 (pre-drought) average, 2 points above the previous record production in 1942 and 7 points above that of last year. Not only the quantity but also the quality of crops is outstanding.

Production of individual crops reflects the generally favorable growing conditions. A 3.3-billion bushel corn crop of excellent quality tops any previous crop. For the third successive year more than a billion bushels of wheat were harvested, production this year breaking all previous records. Rice, soybeans and cherries set new marks in the final harvest returns to join potatoes, tobacco, peaches, pears, plums, and truck crops. Crops with near-record production are oats, peanuts and grapes. Better than average crops of hay, sorghum grain, popcorn, dry peas, sweet-potatoes, apples, prunes, apricots, hops, sugarcane and sugar beets were harvested. Cotton and cottonseed production, however, is about one-third below average and, with the exception of 1921, the smallest since 1895. Other crops falling below average are barley, flaxseed, buckwheat, rye, broomcorn, dry beans, cowpeas, pecan and maple products.

In 1946 the harvested acreage for 52 crops amounted to nearly 346 million acres. This total is slightly smaller than in any of the preceding three years, larger than in any year from 1933 to 1942, but substantially below the 1929-32 level of 355 to 362 million acres. Total acreage changes vary significantly by geographic regions. In 1946 the South Atlantic region harvested the smallest aggregate acreage in the 18 years of record. The South Central region is virtually at the record low level of 1945. The Western region has never harvested a larger acreage. The North Atlantic region is only slightly below the peak total of 1935. The North Central region, which usually accounts for more than half of the total harvested acreage of the country, was within 2 per cent of the 1930 peak of 198.6 million acres. In 6 States—Vermont, Illinois, Michigan, Idaho, Oregon and California—the 1946 harvested acreage tops that of any previous year. Harvested acreages were significantly below the high totals of the early Thirties in the Great Plains States, but this was not so much due to acreage losses as to

larger proportion now summer-fallowed and pastured.

PRODUCTION (in thousands)				
CROP	Unit	Average		
		1935-44	1945	1946
Corn, all.....Bu.		2,608,499	2,880,933	3,287,927
Wheat, all.....Bu.		843,692	1,108,224	1,155,715
Winter.....Bu.		618,019	817,834	873,893
All spring.....Bu.		225,673	290,390	281,822
Durum.....Bu.		31,900	32,840	35,836
Other spring.....Bu.		193,774	257,550	245,986
Oats.....Bu.		1,129,441	1,535,676	1,509,867
Barley.....Bu.		289,598	266,833	263,350
Rye.....Bu.		42,356	23,952	18,685
Buckwheat.....Bu.		7,138	6,644	7,105
Flaxseed.....Bu.		23,426	34,557	22,962
Rice.....Bu.		55,257	68,150	71,520
Popcorn.....Lb.		116,300	427,780	266,752
Sorghums for grain.....Bu.		86,543	97,014	106,737
Sorghums for forage.....Tons ¹		12,012	9,816	8,619
Sorghums for silage.....Tons ²		5,184	3,622	3,701
Cotton, lint.....Bales		12,553	9,015	8,482
Cottonseed.....Tons		5,240	3,664	3,452
Hay, all.....Tons		91,306	108,539	100,860
Hay, wild.....Tons		10,616	13,250	11,530
Alfalfa seed.....Bu.		1,176	1,182	1,658
Red clover seed.....Bu.		1,314	1,750	2,113
Alsike clover seed.....Bu.		304	351	390
Sweetclover seed.....Bu.		883	606	616
Lespedeza seed.....Lb.		143,169	187,000	213,900
Timothy seed.....Bu.		1,783	1,333	1,398
Sudan grass seed.....Lb.		57,514	29,100	23,000
Beans, dry edible.....Bags ³		16,408	13,083	15,797
Peas, dry field.....Bags ³		4,580	5,915	6,926
Soybeans for beans.....Bu.		103,457	192,076	196,725
Cowpeas for peas.....Bu.		6,591	3,790	3,222
Peanuts picked and threshed.....Lb.		1,587,964	2,042,235	2,075,880
Velvetbeans.....Tons		850	525	433
Potatoes.....Bu.		372,756	418,020	474,609
Sweet potatoes.....Bu.		66,422	64,665	66,807
Tobacco.....Lb.		1,479,621	1,993,837	2,235,328
Sorgo sirup.....Gal.		12,213	9,850	12,074
Sugarcane for sugar and seed.....Tons		5,873	6,718	6,418
Sugarcane sirup.....Gal.		20,625	28,711	24,450
Sugar beets.....Tons		9,568	8,626	10,666
Maple sugar.....Lb.		643	237	372
Maple sirup.....Gal.		2,625	991	1,328
Broomcorn.....Tons		44	39	44
Hops.....Lb.		39,631	56,772	53,171
Flax fiber (Ore.).....Tons		13	12	14
Apples, commercial crop.....Pu.		120,962	68,042	121,520
Peaches, total.....Bu.		59,938	81,564	86,448
Pears, total.....Bu.		29,002	34,011	35,488
Grapes, total.....Tons		2,553	2,792	2,851
Cherries (12 States).....Tons		166	148	215
Apricots (3 States).....Tons		236	194	343
Plums (2 States).....Tons		74	73	105

PRODUCTION (in thousands)

Crop	Unit	Average		
		1935-44	1945	1946
Prunes, dried (3 States).....Tons		210	234	214
Prunes, other than dried (3 States).....Tons		81	110	125
Oranges (5 States).....Boxes		81,450	104,520	125,430
Grapefruit (4 States).....Boxes		40,083	63,550	67,320
Lemons (Calif.).....Boxes		11,520	14,500	13,900
Cranberries (5 States).....Bbl.		624	657	846
Pecans (12 States).....Lb.		105,746	138,082	77,155
Tung nuts (5 States).....Tons		12	37	47

¹Dry weight.

²Green weight.

³Bags of 100 pounds (uncleaned).

Bemis Calendar for 1947

A 1947 wall calendar, 15"x32", is being distributed by Bemis Bro. Bag Co. Printed in dark brown on a pale green background, each of the twelve pages features the current month, supplemented by the preceding and the following month.

At the top of each page is a large photograph. Twelve different operations in the manufacture of burlap, cotton and paper bags are featured. Large bold print makes this calendar easy to read, and the photographs are both attractive and educational.

Copies of this calendar are available from any of the thirty-four offices of the Bemis Bro. Bag Co.

On Feeding Plants

According to "Nitrogen News and Views," Dr. W. A. Albrecht, University of Missouri, considers it essential that we increase the nutrient supply of most farm plants. He stated, "Breeding a plant that is able to tolerate starvation is about as impossible as maintaining a race of bachelors beyond the first generation. Although air and water plus sun energy, make up 95 per cent of the total weight of growing plants, the 5 per cent furnished by the soil determines the yield. Even in a year when weather conditions are almost perfect, yields may be low because the 5 per cent usually furnished by the soil is limiting the plant in utilizing the other 95 per cent. And remember, your plants aren't so fortunate as cattle; they can't break through the fence and go where there's more food."

Beers Appointed Secretary of Mid-West Soil Improvement Committee

Zenas H. Beers has been appointed Executive Secretary of the Middle West Soil Improvement Committee and assumed his new duties on January 1, 1947. He succeeds the late Leroy T. Goble, who died last July and who for nearly eight years had directed the committee's educational program.

Mr. Beers, who is 35, has had wide experience in agriculture, agronomy and public relations work. He has been a close student of soil conservation, is a graduate agronomist, has worked on farms and written extensively for leading publications.

For the past five and a half years, Beers has been bulletin editor and associate in extension information at Purdue University agricultural experiment station. Although the major portion of his work at Purdue has been the editing of publications, he has written numerous articles on experiments conducted by research men. With Glenn Sample, editor of the Hoosier Farmer, he developed a program to furnish that magazine with a page of experiment station news each month. This feature has proved highly popular with the magazine's readers.

Beers is a graduate of the University of Wisconsin, where he attended the College of Agriculture. He holds a bachelor's and master's degree in agronomy and agricultural journalism. While in school he was editor of the Wisconsin Country Magazine.

More Grass from Treated Pasture

Dr. W. L. Titsworth, who has an 84-acre farm in McCracken Co., Kentucky, with more than 40 head of dairy cows, told Farm Agent Joe Hurt that he had an accumulation of pasture, despite the fact 16 acres were in corn

and 12 acres had been cut for hay. During the past four years, Dr. Titsworth has improved his farm by applying three tons of limestone, 500 pounds or more of 20 per cent phosphate, 100 pounds of muriate of potash and 300 pounds of ammonium nitrate per acre. On a 20-acre field where there was already a good stand of grasses and legumes, he applied 300 pounds of ammonium nitrate to the acre early in the spring. Although it cost him \$10 per acre, he said he made it back during the first 30 days in early grass for his cattle, thus reducing the amount of grass and hay he had been feeding.

New Prices On Arcadian Nitrate of Soda

The Barrett Division of Allied Chemical & Dye Corporation has announced new prices on Arcadian Nitrate of Soda for the period from January 1, 1947, to June 30, 1947. The price to fertilizer manufacturers is now \$32.00 per ton in bulk, carload lots, f.o.b. Hopewell, Va. For shipment in 100-lb paper bags, an additional charge of \$3.50 per net ton is made. Where tax tags are required, these are charged to buyer's account. The above prices are subject to change without notice.

Cal-Nitro Prices

Synthetic Nitrogen Products Corporation, New York, has announced that, beginning January 1, 1947, the price of Cal-Nitro (20.5 per cent N) in 100-lb. paper bags has been advanced to \$33.00 per net ton, f.o.b. Hopewell, Va. This increase, which is an advance of 50 cents per ton, was due to the higher cost of bags and bagging. There is no change in the bulk price of \$29.00 per ton, f.o.b. Hopewell, Va.

BRADLEY & BAKER

FERTILIZER MATERIALS - FEEDSTUFFS

AGENTS - IMPORTERS - BROKERS

**155 E. 44th Street
NEW YORK**

BRANCHES
 Clinton St. & Danville Ave. 545 Royster Building Barnett Bank Building
 Baltimore, Md. Norfolk, Va. Jacksonville, Fla.
 504 Merchants Exchange Bldg., St. Louis, Mo.

FERTILIZER MATERIALS MARKET

NEW YORK

New Year Finds Fertilizer Materials In Short Supply and In Heavy Demand. Price Increase In Nitrate of Soda and Triple Superphosphate. Foreign Materials Priced Too High for Local Interest. Contract Shipments Behind Schedule.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, JANUARY 6, 1947.

At the beginning of the new year, demand for all basic fertilizer materials is heavy and supplies in most cases are considerably short of meeting inquiry. At the close of the year inventories of all materials were comparatively low with production of both basic ingredients and complete fertilizers at record-high levels. The shortage of nitrogen in all forms remains the most serious problem affecting the industry, and information received from all sources indicates that a nitrogen shortage will exist throughout the current fertilizer year.

Recent price increases to be noted are nitrate of soda, which has been advanced \$3 a ton, and triple superphosphate, on which one major producer has advanced schedule to 71 cents per unit A.P.A. f.o.b. production point. It is expected that other producers will do likewise, thus reflecting recent increases of phosphate rock.

It is hoped that additional supplies of various fertilizer materials will be imported during 1947, but at the present time price ideas of foreign producers are delaying any trade in organics, potash and other materials. Export inquiry, particularly from South America, continues heavy and considerable quantities of superphosphate have been moved to that market.

Sulphate of Ammonia

The effects of the recent loss in production by the steel industry are still being felt, with shipments to fertilizer manufacturers in most cases behind schedule. Pressure from mixers is unabated, and demand unfilled.

Organic Materials

Buying activity has been confined mainly to feed manufacturers as prices remain beyond the reach of fertilizer mixers. All markets are extremely strong, with offerings definitely limited. Tenders of fertilizer bone meal from both Europe and South America have been

in the market recently, with no takers at high asking prices.

Nitrate of Soda

The markets for both imported and domestic materials are extremely firm, with the tight supply situation of recent months continuing. Some increase in available supplies is expected in the near future.

Superphosphate

It is reported that some producers have advanced prices over recent levels, and if possible, this market has become even tighter, with demand continuing in excess of production capacity. Inquiry for triple superphosphate is exceedingly heavy at this time.

Phosphate Rock

Stocks at the end of the year were at extremely low levels, with acidulators taking all supplies when available. The price structure is very firm but some delays in shipments have been reported because of transportation shortages.

Potash

The situation in this market is similar to that of other fertilizer materials—i.e., production remains high and demand unsatisfied in many cases. The prospect of foreign potash to ease the domestic situation is not apparent at this time as production from the French and German mines is being consumed in Europe itself.

PHILADELPHIA

Demand for Materials Still Heavy. Higher Prices for Nitrate of Soda. Increase in Superphosphate Price Expected. Car Shortage Continues.


Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, JANUARY 6, 1947.

There is still no surplus of fertilizer materials. Inventories are said to be less than usual, with a strong demand for all materials and at increased prices. While a recent ar-

Producers of
SULPHUR

Large stocks carried at all times, permitting prompt shipments . . . Uniformly high purity of 99½% or better . . . Free of arsenic, selenium and tellurium.

TEXAS GULF  SULPHUR CO. Inc.
75 E. 45th Street New York 17, N.Y.
Mine: Newgulf, Texas

rival of urea from Germany created considerable interest in fertilizer circles. It is pretty well established that this will go into plastics—not fertilizer. The export demand for oil cake meals is exceedingly strong, and it is said the Department of Agriculture hesitates to grant permission to supply that demand in view of the scarcity of organics here. However, it is thought likely that something over one hundred thousand tons will be exported during the first three months of 1947.

Sulphate of Ammonia.—Market position is very tight with shipments said to be running behind schedule, and demand increasing.

Nitrate of Soda.—Demand is active and in excess of tight supply position. Prices have been advanced on both domestic and Chilean. The domestic price is nominally \$32.00 in bulk, and \$35.50 in 100-lb bags, f.o.b. producing plant in Virginia. The Chilean price is now \$38.50 in bulk and \$41.50 in 100-lb. bags, usual terms and conditions.

Castor Pomace.—No offerings reported, and shipments on contracts.

Blood, Tankage, Bone.—Despite slack feeding demand, recent offerings of these organics found fairly ready sale at recent price levels. There were sales ranging from \$8.50 to \$9.50 per unit of ammonia (\$10.33 to \$11.55 per unit N), and it is significant that quite a few of the sales were for fertilizer use. Steamed bone meal sold at \$80.00 per ton, with the supply very scant.

Phosphate Rock.—The demand is far ahead of production capacity, and car shortage delays shipment of the supply that is available.

Superphosphate.—Contract renewals are said to be expected early this month, but no price announcements have been heard yet. Higher production costs justify an increase. Meanwhile the demand continues ahead of the supply.

Po'ash.—Market position continues tight with steady demand for more than can be produced. Shipments are moving on allocations, but scarcity of cars is causing considerable delay.

CHARLESTON

Heavy Deliveries of Mixed Fertilizers. Material Supplies Still Short and Hampered by Transportation Shortages.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, JANUARY 4, 1947.

Demand for all materials for fertilizer use remains strong as the fertilizer mixing season progresses. Car shortages are a large factor in holding up production. As the year ends a greater proportion of mixed fertilizers has been delivered to farmers than ever before for this time of the season.

Organics.—Organics in general remain high in price. Vegetable meals have firmed up slightly after breaking in the last few weeks. Seven per cent cotton seed meal is quoted around \$73.00 to \$74.00 and 8 per cent cotton seed meal about \$81.00, bagged, f.o.b. Memphis for January shipment. Soya meal bagged is about \$73.50, f.o.b. Memphis. South American packing-house products were shipped in only small quantity during December, due to export controls. Prices were above the domestic market which has recently sold dried ground blood at about \$9.00 per unit ammonia, (\$10.94 per unit N) f.o.b. Baltimore and Chicago. Ground packing-house tankage is quoted at about \$8.50 per unit ammonia (\$10.33 per unit N) and 10 cents per unit B.P.L. for prompt shipment, f.o.b. Chicago in bulk. Domestic nitrogenous is quoted from \$6.00 to \$4.50 per unit ammonia (\$7.29 to \$5.47 per unit N) f.o.b. production point, depending on production point. Supplies of this article are tight.

Castor Pomace.—Recently the market on

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor

::

Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

500 Fifth Avenue, New York

castor pomace has been quiet as producers move supplies against contracts.

Hoof Meal.—Price advanced 50 cents per unit of ammonia during last week of December and sellers hold to \$9.00 (\$10.94 per unit N), f.o.b. Chicago.

Blood.—Market rather firm with prices about same for last two weeks of December.

Nitrate of Soda.—Year ended with supply situation exceedingly tight. The price on domestic nitrate of soda as of January 1, 1947, will be \$32.00 in bulk and \$35.50 per ton in 100-lb. bags, carlots, f.o.b. Hopewell. Imports of soda have been delayed and demand remains far stronger than the supply. Domestic production has continuously been behind because of shortage of soda ash.

Sulphate of Ammonia.—Demand greater than supply and call increasing as the season progresses. Market exceedingly tight.

Ammonia Nitrate.—Stocks low and market tight as demand far exceeds supply.

Potash.—This article remains tight, with car shortages delaying shipments against allocations to customers.

Superphosphate.—Production quickly taken up by strong demand. Producers hampered by shortage of sulphuric acid and curtailed deliveries of rock caused by car shortages at the mines.

Phosphate Rock.—Prices remain firm and call from consumers greater than producers can supply with the present shortage of cars which is cutting deliveries by 35 to 40 per cent.

CHICAGO

Increase In Live Stock Does Not Increase Supply of Fertilizer Organics. Feed Material Prices Decline.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, JANUARY 4, 1947.

Offerings of organics are not improving, although inquiry is quite active. One would think the increase in receipts of live-stock would result in production of fertilizer tankage, but seemingly the little which is being made is being used by the producers and not put on the market.

In feeds, reduced quotations are in effect. Wet rendered tankage sales were about \$7.00 per unit of ammonia (\$8.51 per unit N), while blood was quoted at \$8.00 per unit of ammonia (\$9.72 per unit N) f.o.b. shipping point. Trading has been quiet with buying interest lacking.

CASE HISTORY No. 11

One in a series of factual experiences of a group of American manufacturers with Multi-wall Paper Bags.

COST COMPARISON (Per Ton)

	100-lb. Barlap Bags	Paper Bags
Container cost	\$2.00	\$.98
Labor cost53	.18
Total container and labor cost	\$2.53	\$1.16
Saving per ton, paper over fabric		\$1.40

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER ✓
CHEMICALS	FOOD
FEEDSTUFFS	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR
CORROSIVE	HEAVY ✓
DELIQUESCENT	HYGROSCOPIC
FLUFFY	LIGHT
FREE-FLOWING ✓	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speeds, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute.

They struck it rich by changing to a

ST. REGIS PACKAGING SYSTEM

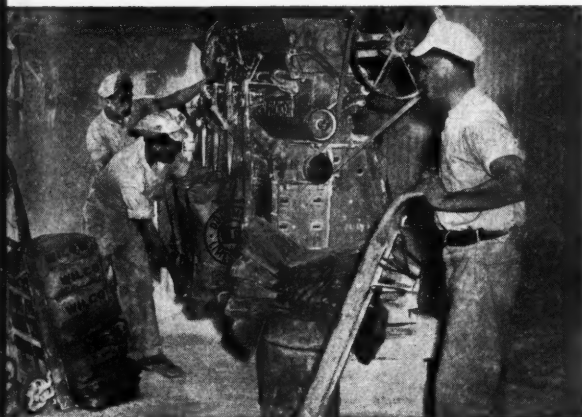
By analyzing its packaging costs with a critical eye, a lime-mining company dug deeper into the facts and uncovered a rich "find"—considerably lower packaging costs and a better container for its product.

This company—Willingham-Little Stone Company of Atlanta, Ga.—mines and processes dolomitic limestone, which is sold primarily as a neutralizer for acid soils. Formerly the product had been packaged in burlap bags. Now the company changed to a St. Regis Packaging System (packer and multiwall paper valve bags). The economies resulting from this modern packaging system are far beyond expectations:

- Container costs were reduced by 51%; labor costs went down 68%—a total reduction of 55% in packaging costs!
- Packaging output jumped from 15,000 lbs. to 40,000 lbs. per hour—a 166% gain!
- Customers expressed enthusiastic approval of Multiwalls, noting that they virtually eliminated siftage and made a cleaner, easily-handled package.

This "case history" is one of many examples of the outstanding savings made possible by St. Regis Packaging Systems in the rock products, chemical, food, fertilizer industries. For the complete picture story of this efficient operation, mail the coupon to the nearest St. Regis office.

Left: The St. Regis 107-FC packer, which simultaneously fills and weighs 100-lb. multiwall paper valve bags.
Right: Four filling tubes permit uninterrupted packing.



MULTIWALL

ST. REGIS SALES CORPORATION
(Sales Subsidiary of St. Regis Paper Company)

NEW YORK 17: 230 Park Ave. CHICAGO 1: 230 So. Michigan Ave.
PHILADELPHIA 2: 1925 S. 11th St. SAN FRANCISCO 4: 1 Montgomery St.

Send this coupon for the complete story

ALBANY, N.Y. Birmingham Boston Cleveland Dallas Denver
Hartford, Conn. Kansas City, Mo. Los Angeles Louisville, Ky. New Orleans
Philadelphia, Pa. Portland, Ore. St. Louis, Mo. Seattle, Wash. Toledo, Ohio
Wichita, Kan. Yonkers, N.Y. Zanesville, Ohio

CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal, Vancouver.

Without obligation, please send me full details regarding "Case History" No. 11, outlined above.

NAME

COMPANY

ADDRESS

Seed Bed Too Well Done Helps Weeds

The 200-year-old copy book maxim, "what-ever is worth doing at all is worth doing well," may sometimes lead to doing some work too well to get the desired effect. Such an un-toward result has come to some farmers who adopted the U. S. Department of Agriculture's new treatment for control of weeds in tobacco plant beds.

The method consists in treating the bed in the fall with calcium cyanimide and urea and then planting seed in it in the spring after working in fertilizer. This method, developed by scientists of the Bureau of Plant Industry, Soils, and Agricultural Engineering, in co-operation with State Agricultural Experiment Stations, has been used only two seasons and some of the farmers have reported a great many weeds in spite of the precaution. "Now," says Dr. E. E. Clayton, of the Bureau of Plant Industry, Soils, and Agricultural Engineering, "we find that preparing the seedbed too deep brings up viable weed seeds from below after the killing power of the chemicals has disappeared." Their tests showed that in the top inch the treatment killed 96 per cent of the weed seeds; in the next inch layer the kill was

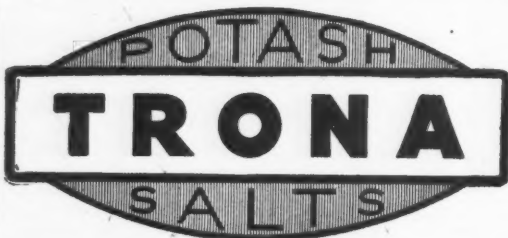
95 per cent; in the third inch it was 82 per cent; and in the fifth inch it was only 59 per cent. The seeds down three inches or more below the surface do not sprout unless brought to the surface.

Deep preparation has long been considered one of the marks of good farming, but following the general rule in this case resulted in defeating the object of the treatment by bringing viable weed seeds near to the surface.

The Department recommends that in working the fertilizer into the plant beds, which is done in the spring, the ground be stirred to a depth of one to one and a half inches only. Much more than that gets into the zone of considerable numbers of live seeds. The tobacco seeds, being almost dust fine, are sown on the surface.

Fertilizer Boosts Iowa Corn Yields

Barnyard manure, lime and potassium, coupled with good crop rotations, continue to offer the key to high Iowa corn yields on the basis of long-time studies of the Iowa Agricultural Experiment Station. The most recent results continue in line with previous 10-year observations. On Clarion-Webster soils a significant increase in all rotations, as well as



AMERICAN POTASH and CHEMICAL CORPORATION

122 East 42nd St.

New York City

Pioneer Producers of Muriate in America

Branch Offices

214 Walton Building
ATLANTA 3, GEORGIA

231 South La Salle Street
CHICAGO 4, ILLINOIS

609 South Grand Avenue
LOS ANGELES 14, CALIF.

MURIATE and SULPHATE of POTASH

Plant foods are urgently needed to grow the crops which feed our nation and our armed forces.

Our plant at Trona, Calif., is operating at capacity to provide supplies of these essential plant foods, and other materials needed in the national effort.

Manufacturers of Three Elephant Borax and Boric Acid

See page 25

A Complete Service

THE strategic factory locations of The American Agricultural Chemical Company, as shown on the accompanying map, assure prompt, dependable service for the complete line of products listed below.

We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Bone Ash, Bone Oil, Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Ammonium Carbonate, Ammonium Fluosilicate, Magnesium Fluosilicate, Potassium Fluosilicate, Phosphorus Pentasulphide, Phosphorus Sesquisulphide (lump), Zinc Fluosilicate, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish and Blood. We mine and sell all grades of Florida Pebble Phosphate Rock.



FACTORIES

Alexandria, Va.	Cleveland, Ohio	No. Weymouth, Mass.
Baltimore, Md.	Detroit, Mich.	Pensacola, Fla.
Buffalo, N. Y.	Greensboro, N. C.	Pierce, Fla.
Carteret, N. J.	Havana, Cuba	Port Hope, Ont., Can.
Cayce, S. C.	Henderson, N. C.	Savannah, Ga.
Chambly Canton, Quebec, Can.	Montgomery, Ala.	Searsport, Maine
Charleston, S. C.	Nat. Stockyards, Ill.	South Amboy, N. J.
Cincinnati, Ohio	Norfolk, Va.	Spartanburg, S. C.
		Wilmington, N. C.

The AMERICAN AGRICULTURAL CHEMICAL Co.

50 Church Street, New York 7, N. Y.

SALES OFFICES

Alexandria, Va.	Columbia, S. C.	Montgomery, Ala.	Pierce, Fla.
Baltimore, Md.	Detroit, Mich.	Montreal, Quebec, Can.	Port Hope, Ont., Can.
Buffalo, N. Y.	Greensboro, N. C.	National Stockyards, Ill.	Savannah, Ga.
Carteret, N. J.	Havana, Cuba	New York, N. Y.	Spartanburg, S. C.
Charleston, S. C.	Henderson, N. C.	Norfolk, Va.	Wilmington, N. C.
Cincinnati, Ohio	Houlton, Me.	No. Weymouth, Mass.	
Cleveland, Ohio	Laurel, Miss.	Pensacola, Fla.	



on ground continuously in corn since 1915, was obtained by the addition of manure.

The ground continuously in corn yielded 29.8 bushels per acre in 1945 without manure and produced 55.2 bushels where 2 tons of manure were applied per acre.

In a corn, oats, clover rotation, the yield was boosted from 55 bushels to 78 by adding manure at a rate of 2 tons per acre per year. For corn, corn, oats and clover the yields were 55.4 without manure and 70.4 with the addition of 2 tons. Corn, corn, oats, clover, clover yielded 53.4 bushels, with 73.1 bushels resulting when manured.

With a rotation of corn, corn, oats and clover the addition of 150 pounds of 0-20-0 fertilizer, plus 2 tons of manure and enough lime to meet requirements, gave a corn yield of 77.7 bushels. When 200 pounds of 2-12-12 fertilizer were substituted for the 0-20-0, the yield was 85 bushels per acre, indicating the value of potassium as well as phosphate.

Using the same rotation and applications, except that no manure was applied, yields were 60 bushels with the 0-20-0 and 85 bushels with 2-12-12. Since the amount of nitrogen was slight, most of the 25.4 bushel increase can be attributed to the addition of potassium. —*Iowa Farm Science, Ames, Iowa.*

Use of Fertilizer Ups Apple Yields

Use of plenty of good fertilizer and other good orchard management practices have enabled a unit test demonstration farmer in Fannin County, Georgia, profit on his apple orchard when many other farmers in his section were not able to produce profitable apple crops. This farmer, J. W. Wilson, produced \$200 worth of apples from one tree in his orchard in 1946.

Although the apple crop on the Wilson farm was damaged by weather early in the year, a 2,500-bushel crop was grown. This was the eleventh consecutive year that the Wilson orchard has returned a profit.

"I've been willing to spend some money every year to keep my trees in good condition," Mr. Wilson says. "It pays to spend \$10 or \$15 per tree for spray materials and fertilizer if that tree produces apples worth several times that much in the fall."

W. R. Mercier, Fannin county agent, points out that Mr. Wilson keeps detailed records on production and can point out a half-dozen trees that produced more than a hundred dollars worth of apples in 1946.

This apple grower is a great believer in fertilizer. Winter vetch now growing in the



Maximum Protection—



FOR YOUR PRODUCTS IN TRANSIT—
IN STORAGE AND "ON THE JOB"

HAMMOND

SEWN or
PASTED

BAGS

FOR CEMENT
FERTILIZERS
LIME
SUGARS
PLASTER
CHEMICALS

and many other products

Maximum protection provided by HAMMOND Bags means that your product reaches the ultimate consumer in best possible condition. HAMMOND Multi-Wall Bags are noted for their added product-protection . . . rich, attractive, colorful labels that impressively identify your product . . . low cost . . . easy handling . . . and ability to withstand rough handling in any kind of weather. JUST ASK THE HAMMOND MAN!

HAMMOND BAG & PAPER COMPANY

PAPER MILL AND BAG FACTORY
WELLSBURG, W. VA.



**VC
PRODUCTS**

MIXED FERTILIZERS
SUPERPHOSPHATES
TRIPLE SUPERPHOSPHATE
PHOSPHATE ROCK
SULPHURIC ACID
PHOSPHORIC ACID
CALCIUM PHOSPHATES
MONOCALCIUM PHOSPHATE
SODIUM PHOSPHATES
TRISODIUM PHOSPHATE
CLEANSERS AND DETERGENTS
BURLAP AND COTTON BAGS

**VIRGINIA-CAROLINA
CHEMICAL CORPORATION**

HOME OFFICE: RICHMOND, VA.

Keyed SERVICE!

Fertilizer plants all over the country—large and small—state their needs and we meet them. Large stocks of seasoned materials and ample modern production facilities enable us to make prompt shipments.

TRIPLE SUPERPHOSPHATE

46 to 48% Available Phosphoric Acid

We also manufacture

HIGH-GRADE SUPERPHOSPHATE

U. S. Phosphoric Products

Division
TENNESSEE CORPORATION

Tampa, Florida

New York Office:
61 Broadway
Washington, D. C.
440 The Woodward Bldg.

Sales Agents:
Bradley & Baker
155 East 44th St
New York, N. Y.

A Mark of



Reliability

**"JAY
BEE"**



FERTILIZER GRINDER

"Jay Bee" grinds every grindable fertilizer ingredient, coarse or fine, cool and uniform.

All steel construction—heavy cast iron base. Practically indestructible. Biggest capacity for H.P. used. Handles products with up to 14% grease—30% moisture. Delivers finished products to storage bins without screens or elevators. Sizes and styles from 20 H.P. to 200 H.P. to meet every grinding requirement.

Write for complete details. Please state your grinding requirements.

J. B. SEDBERRY, INC.

Franklin, Tenn.

Utica, N. Y.

orchard received 400 pounds of 4-8-6 fertilizer per acre when it was planted last fall. Then, each spring Mr. Wilson applies 14 pounds of high-grade fertilizer under each tree. He scatters fertilizer on top of the ground under the branches of the trees and lets it soak into the land.

Lespedeza grows in the orchard during the summer and both summer and winter crops are turned under. Nothing is ever taken from the land but apples.

Each acre of land has had around four tons of lime applied during the past few years and also all the land has been treated with phosphate.

Many trees in the Wilson orchard have trunks as large as a man's body. Trees in a nearby orchard set out at the same time the Wilson orchard was started are about the size of a man's arm. The neighboring orchard was not fertilized.

Nitrogen Plus Phosphate Increases New Mexico Cotton Yields

A mixture of nitrogen and phosphate is the best fertilizer for irrigated cotton production in New Mexico, Glen Staten, associate agronomist at the state experiment station, said recently.

Staten declared that 22 tests on A & M College fields in the past 17 consecutive years have shown an increase of about one pound of lint cotton for every pound of mixed available nitrogen and phosphate applied to the soil.

Applied separately, though, neither nitrogen or phosphate was as effective as the two used together, Staten said. Each pound of available phosphate increased the lint yield by only four-tenths of a pound and each pound of available nitrogen increased the yield by only seven-tenths of a pound.

"For land producing one to one and one-half bales or less, the experiment station recommends 60 to 100 pounds of available nitrogen and 40 to 45 pounds of available phosphate per acre, depending on the past history of the field," the agronomist stated. "This will mean, for example, two sacks of 16-20-0 ammo-phos and one sack of ammonium nitrate or one sack of 11-48-0 ammo-phos and two sacks of ammonium nitrate."

Staten said that these mixtures are the ideal, but because of the present scarcity of fertilizers, farmers can only attempt to reach the required amounts of available plant food per acre. He advised farmers, for the time being, to apply fertilizer only to cotton land

that produces less than one and a half bales an acre.

"Cost per pounds of available plant food, price of cotton, and expected returns per acre are factors that must be considered before applying fertilizer to cotton," the agronomist said. "The present approximate cost of nitrogen is from 10 to 13 cents per pound, phosphate six to eight cents per pound, and mixed fertilizers $8\frac{1}{2}$ to $13\frac{1}{2}$ cents per pound."

Fertilizers Boost Farm Incomes

In Cass County, Texas, wide interest is being attracted among neighbors of Farm Unit Demonstrators who are reporting that fertilization is boosting their farm incomes as much as 50 per cent over what they made before beginning the program.

Cass County Agricultural Agent E. M. Trew Jr., bears out reports of the FUD successes, and points to Farm Unit Demonstrator Roy Melton, Cass County farmer, as a representative example. Since he launched a farm unit demonstration, Melton reports that his farm is making more money with no hired help than it formerly did when he kept two full-time hands working. Melton figures he nets half again as much profit from his farm by practicing

CHEMICO
the leading name
in acid plants



Complete Acid Plants, Acid Concentrators, Ammonia Oxidation Units and Complete Fertilizer Plants designed, installed, and fully guaranteed. Preliminary consultation will involve no charge or obligation. Your inquiry is invited.

Chemical Construction Corporation
350 Fifth Ave., New York 1, N. Y.

**CHEMICO PLANTS are
PROFITABLE INVESTMENTS**

Ashcraft-Wilkinson Co.

**Fertilizer
Materials**



**Feeding
Materials**

ALL FERTILIZER MATERIALS

FOREIGN AND DOMESTIC

Ammonium Nitrate Sulphate of Ammonia
Organic Ammoniates Sulphur

Exclusive Distributors: DUVAL TEXAS SULPHUR

Vegetable Oil Meals and Feedstuffs

HOME OFFICE: ATLANTA, GA.

BRANCHES:
NORFOLK, VA.
CHARLESTON, S. C.
JACKSON, MISS.
TAMPA, FLA.

CABLE ADDRESS:
ASHCRAFT

SUBSIDIARIES:
INTERSTATE MILLS, INC.
CAIRO, ILL.
INTERSTATE WAREHOUSE
MOUNDS, ILL.

SPECIFY THREE ELEPHANT



... WHEN BORON IS NEEDED TO CORRECT A DEFICIENCY OF THIS IMPORTANT SECONDARY ELEMENT

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

AMERICAN POTASH & CHEMICAL CORPORATION
122 East 42nd ST., NEW YORK CITY

Pioneer Producers of Muriate of Potash in America

See Page 20

ing FUD methods. As an example of how fertilization has paid off, Melton tells of the native meadow to which he applied 46 per cent superphosphate, 200 pounds to the acre, back in 1943. This year he cut four tons of hay per acre off the meadow, while an unfertilized check-plot nearby yielded only two and a half tons per acre.

Fertilizing Apples in Delaware

According to Delaware Extension Bulletin No. 45, apple trees require annual applications of a fertilizer containing nitrogen, phosphorus, and potassium such as a 10-6-4. Any grade of fertilizer which contains these three elements may be used. The rate of application is based on the nitrogen content. Each tree should receive at least 0.04 pound of actual nitrogen for each year of age until a maximum of 1 to 1½ pounds is being applied annually. Using a 10-6-4 fertilizer, this requires ½ to ¾ pounds for each year of age of the tree until 10 to 15 pounds of a 10-6-4 are being applied annually to each tree. The fertilizer should be broadcast around the tree over an area slightly greater than the limb spread. Often it is desirable to apply part of the fertilizer in the fall and part in the spring. When this method is used, half may be applied in late September or early October and the other half in February or March. When all of the fertilizer is put on at one time, spring application is more desirable; however, fall application is necessary if the fertilizer contains cyanamide as a source of nitrogen.

The Utah Agricultural Experiment Station recommends the use of commercial fertilizer on winter wheat in the dry-land wheat producing areas of the state, at present prices. Tests have shown that nitrogen fertilizer gives increased yields or higher protein content, or both.

WORLD SOILS AND FERTILIZERS

(Continued from page 10)

recognized, of course, that a large proportion of these Podzols and Red soils are unsuitable for agriculture because of the unfavorable topography and stoniness.

The principal areas of Red soils are in Africa, South America, Southeastern Asia, including India, the Pacific Islands, and Southeastern North America. Most areas of Red soils are now in use in Southeastern Asia and India, and large areas are in use in some of the Pacific Islands and in the United States; but the resources of these soils are almost untouched in Africa and South America. If we assume that only 20 per cent of the Red soils of the tropics in South America and Africa alone were to be brought into production, about 900,000,000 acres would be added to the world acreage for food production. To these potential cultivated new areas of Red soils may be added a large area of uncultivated tropical soils found on the great islands of Sumatra, Borneo, New Guinea, and Madagascar. Assuming, then, that at least another 100,000,000 acres of Red tropical and Alluvial soils are available in these and other warm parts of the world, the total of one billion acres of tropical and subtropical soils may be used in calculating world soil potentialities.

The Podzols, located almost wholly in the north part of the northern hemisphere, are found mostly in Soviet Russia, Canada, and the United States. If we were to assume that only 10 per cent of these soils were brought into cultivation, another 300,000,000 acres would be added to world acreage for food production.

The world's uncultivated areas are, of course, generally less fertile than those already under cultivation. To maintain continued productivity these soils would need fairly heavy fertilization. The question of serious



Trade Mark Registered

MAGNESIUM LIMESTONE

"It's a Dolomite"

American Limestone Company

Knoxville, Tenn.

THE BRADLEY HERCULES MILLS**AND GRIFFIN MILLS**

For Fine or Semi-Fine Grinding of
PHOSPHATE ROCKS and LIMESTONE

Capacities 1 to 50 Tons Per Hour

Catalogs Mailed on Request

BRADLEY PULVERIZER COMPANY

Allentown, Penna.



**76 YEARS MAKING
GOOD BAGS**

**FULTON
QUALITY**

TEXTILE BAGS • WATERPROOF PAPER LINED BAGS

Fulton Bag & Cotton Mills

Manufacturers Since 1870

ATLANTA ST. LOUIS DALLAS MINNEAPOLIS
NEW YORK NEW ORLEANS DENVER KANSAS CITY, KAN.

**ALEX. M. McIVER
& SON**

Specializing
SULPHURIC ACID

Nitrogenous Materials
Blood and Fertilizer Tankage

Phosphate Rock

Bone Meals

Dolomitic Lime

(42—44% Magnesium Carbonate)

Bags

Soya Meal and Cottonseed Meal

**SOUTH AMERICAN DRY
RENDERED TANKAGE**

PEOPLES OFFICE BUILDING

Charleston, S. C.

**Armour's
FERTILIZER
MATERIALS**

SUPERPHOSPHATE

PHOSPHATE ROCK

DOUBLE SUPERPHOSPHATE

SULPHURIC ACID

BONE MEALS

DRIED BLOOD

TANKAGES

BONE BLACK

PULVERIZED SHEEP MANURE

SHREDDED CATTLE MANURE

PIGMENT BLACK

SODIUM FLUOSILICATE

**ARMOUR
FERTILIZER WORKS**

**GENERAL OFFICES: HURT BUILDING
ATLANTA, GA.**

**MAILING ADDRESS: P. O. BOX 1488
ATLANTA 1, GA.**

erosion, especially in the tropical areas, need be met if there is expansion in this direction. In the last two decades, however, a body of science dealing with erosion control has been developed which gives us confidence that the problem could be met adequately. We could develop. We need not exploit.

If this huge body of 1,300,000,000 acres of new land were brought into production, what would be the world food picture? Again, without adequate production data we must estimate by making comparisons with production figures from similar areas. For estimating the possible production of the billion acres of tropical land we have chosen the Philippines as a yardstick because it is one of the few tropical countries that can be considered fairly representative of the tropical soil region, and that had even approximately complete food production records. Finland similarly was chosen as representative of the 300,000,000 acres available in the Podzol group. By applying the approximate production per acre of the principal classes of food obtained in the Philippines to the billion acres of tropical soils, and that obtained in Finland to the 300,000,000 acres of Podzol

soils, we arrive at the data presented in Table III.

World food needs in 1960 could thus be met for all classes of food except meat, milk, and pulses and nuts, by production increases on present crop land acreage plus the production of one billion acres of tropical soils, if these soils were used as intensively and for the same classes of food products as the cultivated soils of the Philippines are now used. We could have more than enough cereals, roots and tubers, sugar, fats and oils, and fruits and vegetables. In addition, the need for pulses and nuts could be easily met or exceeded by shifting some of the production of coconuts from oil to edible nuts.

If production of 300 million acres of North Temperate Zone soils were added to the increase from the present crop land, and used as intensively and for the same classes of food products as the cultivated soils of Finland are used, the world food needs in 1960 would be met for cereals, roots and tubers, sugar, and milk, in addition, the need for fats and oils would be very nearly met.

World production from all our three sources combined—present world crop land, one billion

TABLE III
POTENTIAL FOOD PRODUCTION FROM MORE INTENSIVE USE OF EXISTING CROP LAND PLUS
DEVELOPMENT OF ADDITIONAL LAND NOT NOW CULTIVATED

	Cereals	Roots and tubers	Sugar	Fats and oils	Pulses and nuts	Fruits and vegetables	Meat	Milk
	(millions of metric tons)							
Attainable production from present crop land.....	360.0	230.0	34.5	18.0	43.4	211.0	78.7	180.2
Attainable production from present crop land plus one billion new acres tropical soils ¹	717.5	469.5	177.5	69.5	55.4	470.0	89.4	188.8
Attainable production from present crop land plus 300 million new acres land outside tropics ²	395.5	296.0	35.1	19.4	44.2	211.0	86.1	314.6
Attainable production from all above sources.....	753.0	535.5	178.1	70.9	56.2	470.0	96.8	323.2
World food needs in 1960.....	363.5	194.5	33.6	20.4	65.2	411.0	95.8	300.0

¹Obtained by applying the approximate average production per crop acre in the Philippine Islands to 1,000,000 acres.

²Obtained by applying the approximate average production per crop acre in Finland to 300,000,000 acres of Northern Hemisphere soils. Fats and oils and fruits and vegetables are underestimated because Finnish production figures on farm-made butter, meat, fruits, and vegetables were unavailable.

S

tedman

FERTILIZER PLANT EQUIPMENT

*Dependable
for Fifty Years*

Founded 1834

**All-Steel
Self-Contained
Fertilizer
Mixing Units**

**Batch Mixers—
Dry Batching
Pan Mixers—
Wet Mixing**

**Swing Hammer
and Cage Type
Tailings
Pulverizers**

**Vibrating Screens
Dust Weigh
Hoppers
Acid Weigh Scales**

STEDMAN'S FOUNDRY & MACHINE WORKS 505 Indiana Ave. AURORA, INDIANA, U.S.A.



helps to a healthy future

- FOR YOU
- FOR YOUR COMPANY
- FOR AMERICA

THIS TIME IT'S FOR YOU—



A booklet for employees. Explains how the payroll savings plan works . . . goals to save for.

OFFICIAL APPOINTMENT—

The person appointed Savings Bond Officer for his organization is entitled to display this certificate of identification.



OFFICIAL COMMENDATION—

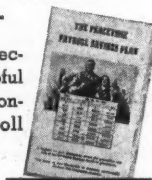


A certificate of commendation by the U. S. Treasury for every company operating the payroll savings plan.

You can display it proudly.

THE PEACETIME PAYROLL SAVINGS PLAN—

A booklet for key executives. Contains helpful suggestions on the conduct of your payroll savings plan.



If you're not already using these helps to a healthy future, get in touch with your State Director of the Treasury Department Savings Bonds Division. Keep up your payroll savings plan. It builds security for all!

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and Advertising Council

acres of new tropical, and 300 million acres of extra-tropical soils—would exceed world food needs for all classes of food except milk, and pulses and nuts, under the assumptions used, and would exceed them for all classes if a portion of the production of coconuts were shifted from coconut oil to edible nuts. Production of cereals, roots and tubers, sugar, and fats and oils would be far in excess of amounts needed.

To meet world food needs, then, much less than all of these sources of production are required, if efforts were made to produce primarily those classes of foods in deficit.

World Fertilizer Supply

In discussing potential world food production either through intensified farming of old land or by developing new areas, there is one over-lying factor affecting both. Greatly increased quantities of fertilizer will be required. The question arises, then—how adequate are world supplies of fertilizers?

Since nitrogen fertilizer can be manufactured by fixation of nitrogen from the atmosphere, world supplies are limited only by capacity of plants to produce. This plant

capacity was expanded greatly in the last decade, because nitrates are a necessity of war.

With phosphate and potash, on the other hand, we must depend on natural deposits to fill world needs. In Table IV we compare known phosphate and potash supplies with potential needs for meeting world food goals. Again it is necessary to make several assumptions. First, we assume that present world crop land would scarcely need a heavier rate of applications than now used in France. You will note that the rate of fertilization in France is several times the present world rate. Second, we assume that the additional billion acres of tropical soils would scarcely need heavier applications than the rate in Hawaii, which is among the highest for all tropical areas. Third, we assume that the 300,000,000 acres of extra-tropical soils will again need no heavier rate of application than that of France. Thus, in all three areas we have chosen countries for comparative purposes which use fertilizer at a relatively high rate so that the estimate on world reserves is conservative.

The resulting amounts of fertilizer used under these conditions would be about eight times the present consumption of phosphate, and nearly 18 times the present consumption of potash. Even so, the known world reserves of phosphate would last more than 5,000 years and the known reserve of potash 500 years. The world has not been thoroughly explored for these minerals. Doubtless actual reserves exceed known reserves greatly. There are also many sources of potash, other than those included in the known reserves, that may be developed when economical methods of extraction are devised. This latter point again emphasizes how conservative these estimates are, for no allowance was made for technical improvements in the fertilizer industry.

Here, then, is an affirmative answer to the question: Do we have the natural resources to meet world food goals by 1960? This answer is a challenge to all men; not to scientists only. For it raises immediately an even more critical question: Can we mobilize these resources to produce the needed food? This question begs many answers, because it involves the whole field of human relationships.

Science may discover and point the way—but it cannot dictate. The full measure of success in economic, social, and political action comes only with the will of the majority—not from the desire of one group.

If the people of the world really have the determination to give battle to the problem of hunger, if they are willing to extend a small part of the energy and capital poured into World War II, then can we hope for victory.

TABLE IV
FERTILIZER IN RELATION TO EXPANDED
FOOD PRODUCTION¹

Rate of Fertilizer Use in Kg per Hectare of Land Used for Crops:		
	P ₂ O ₅	K ₂ O
World	5.0	3.2
United States	4.9	2.6
France	17.1	12.7
Hawaii	41.0	80.0
World Annual Requirement of Fertilizer Under Expanded Food Production:		
	P ₂ O ₅ (metric tons)	K ₂ O (metric tons)
On 1,940,000,000 acres ex- isting crop land at rate of France	13,425,000	9,970,000
On 1,000,000,000 acres (new) tropical soils at rate of Hawaii	16,400,000	32,000,000
On 300,000,000 new acres extra-tropical soils at rate of France	2,000,000	1,500,000
Total	31,825,000	43,470,000
	P ₂ O ₅ (Billion metric tons)	K ₂ O (Billion metric tons)
Known world reserves	166	22.5
	(years)	(years)
Years' supply will last under expanded food produc- tion	5,200	500

¹Data on fertilizer use from USDA Misc. Pub. 593.

BUYERS' GUIDE • A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

AMMONIA—Anhydrous and Liquor

DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE

Spencer Chemical Co., Kansas City, Mo.

BAG MANUFACTURERS—Burlap

Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton

Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Paper

Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Hammond Bag & Paper Co., Weisburg, W. Va.
Jaite Company, The, Jaite, Ohio
Raymond Bag Co., Middletown, Ohio.
St. Regis Paper Co., New York City.

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
Huber & Company, New York City.
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES

St. Regis Paper Co., New York City.
Union Special Machine Co., Chicago, Ill.

BAG PRINTING MACHINES

Schmuts Mfg. Co., Louisville, Ky.

BAGGING MACHINES—For Filling Sacks

Exact Weight Scale Co., Columbus, Ohio
St. Regis Paper Co., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

BONE BLACK

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City.

BONE PRODUCTS

American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmalts, Jos. H., Chicago, Ill.

BORAX AND BORIC ACID

American Potash and Chem. Corp., New York City.

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Schmalts, Jos. H., Chicago, Ill.

BUCKETS—For Holets, Cranes, etc.

Hayward Company, The, New York City.

BUCKETS—Elevator

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARS AND CARTS

Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Utility Works, The, East Point, Ga.

CHEMICALS

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

CHEMISTS AND ASSAYERS

Gascone & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS

American Limestone Co., Knoxville, Tenn.
Keim, Samuel D., Philadelphia, Pa.

COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmalts, Jos. H., Chicago, Ill.

CYANAMID

American Agricultural Chemical Co., New York City.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.

DRYERS

Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

FERTILIZER (Mixed) MANUFACTURERS

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
International Minerals and Chemical Corporation, Chicago, Ill.
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
McIver & Son, Alex. M., Charleston, S. C.

FOUNDERS AND MACHINISTS

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Utility Works, The, East Point, Ga.

A Classified Index to Advertisers in
"The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the
Advertisers, see page 33

HOPPERS

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.

INSECTICIDES

American Agricultural Chemical Co., New York City.

LIMESTONE

American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.

LOADERS—Car and Wagon

Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling

Chemical Construction Corp., New York City.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Utility Works, The, East Point, Ga.

MACHINERY—Ammoniating

Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Elevating and Conveying

Hough Co., The Frank G., Libertyville, Ill.
Hayward Company, The, New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

MACHINERY—Grinding and Pulverizing

Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Sedberry, Inc. J. B., Franklin, Tenn. and Utica, N. Y.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

MACHINERY—Material Handling

Hayward Company, The, New York City.
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

MACHINERY—Mixing, Screening and Bagging

Exact Weight Scale Co., Columbus, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

MACHINERY—Power Transmission

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Superphosphate Manufacturing

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

MANGANESE SULPHATE

McIver & Son, Alex. M., Charleston, S. C.

MIXERS

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

NITRATE OF SODA

American Agricultural Chemical Co., New York City.

NITRATE OF SODA—Continued

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.

NITROGENOUS ORGANIC MATERIAL

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., Wilmington, Del.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.

NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.

PHOSPHATE ROCK

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Ruhm, H. D., Mount Pleasant, Tenn.
Schmaltz, Jos. H., Chicago, Ill.
Virginia-Carolina Chemical Corp., Richmond, Va.

PLANT CONSTRUCTION—Fertilizer and Acid

Chemical Construction Corp., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

POTASH SALTS—Dealers and Brokers

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Schmaltz, Jos. H., Chicago, Ill.

POTASH SALTS—Manufacturers

American Potash and Chem. Corp., New York City.
Potash Co. of America, New York City.
International Minerals & Chemical Corp., Chicago, Ill.
United States Potash Co., New York City.

PRINTING PRESSES—Bag

Schmutz Mfg. Co., Louisville, Ky.

PYRITES—Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.

REPAIR PARTS AND CASTINGS

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Utility Works, The, East Point, Ga.

ROUGH AMMONIATES

Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Scar-Lipman & Co., Inc., New York City.
Schmaltz, Jos. H., Chicago, Ill.

SCALES—Including Automatic Bagging

Exact Weight Scale Co., Columbus, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Utility Works, The, East Point, Ga.

BUYERS' GUIDE

SCREENS

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Utility Works, The, East Point, Ga.

SEPARATORS—Air

Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers

Monarch Mfg. Works, Inc., Philadelphia, Pa.

SULPHATE OF AMMONIA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Hydrocarbon Products Co., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.

SULPHUR

Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Davison Chemical Corporation, Baltimore, Md.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

TANKAGE

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.

UREA

DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR

DuPont de Nemours & Co., E. I., Wilmington, Del.

VALVES

Monarch Mfg. Works, Inc., Philadelphia, Pa.
Utility Works, The, East Point, Ga.

Alphabetical List of Advertisers

American Agricultural Chemical Co.,
New York City.....21
American Limestone Co., Knoxville, Tenn.....26
American Potash and Chemical Corp., New York
City.....20, 25
Armour Fertilizer Works, Atlanta, Ga.....27
Ashcraft-Wilkinson Co., Atlanta, Ga.....25
Baker & Bro., H. J., New York City....Front Cover
Bemis Bro. Bag Co., St. Louis, Mo.....3
Bradley Pulverizer Co., Allentown, Pa.....27
Bradley & Baker, New York City.....14
Chase Bag Co., Chicago, Ill.....5
Chemical Construction Corp., New York City.....24
Du Pont de Nemours & Co., E. I., Wilmington, Del., 4
Exact Weight Scale Co., Columbus, Ohio.....—
Fulton Bag & Cotton Mills, Atlanta, Ga.....27
Gascoyne & Co., Inc., Baltimore, Md.....34
Hammond Bag & Paper Co., Wellsburg, W. Va.....22
Hayward Company, The, New York City.....34
Hough Co., The Frank G., Libertyville, Ill.....—
Huber Co., L. W., New York City.....—
Hydrocarbon Products Co., New York City.....17
International Minerals & Chemical Corporation,
Chicago, Ill.....Back Cover
Jaite Company, The, Jaite, Ohio.....—
Keim, Samuel D., Philadelphia, Pa.....33
McIver & Son, Alex. M., Charleston, S. C.....27
Mente & Co., Inc., New Orleans, La.....—
Monarch Mfg. Works, Inc., Philadelphia, Pa.....34
Potash Co. of America, New York City....3rd Cover
Raymond Bag Co., Middletown, Ohio.....—
Ruhm, H. D., Columbia, Tenn.....34
Sackett & Sons Co., The A. J., Baltimore, Md.....—
Scar-Lipman & Co., Inc., New York City.....—
Schmaltz, Jos. H., Chicago, Ill.....34
Schmutz Mfg. Co., Louisville, Ky.....—
Sedberry, Inc., J. B., Franklin, Tenn. and Utica N. Y....23
Shuey & Company, Inc., Savannah, Ga.....34
Spencer Chemical Co., Kansas City, Mo.....6
Stedman's Foundry and Machine Works, Aurora,
Ind.....28
St. Regis Paper Co., New York City.....18, 19
Sturtevant Mill Company, Boston, Mass.....—
Texas Gulf Sulphur Co., New York City.....16
Titlestad Corporation, Nicolay, New York City.....—
Union Special Machine Co., Chicago, Ill.....—
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.....23
United States Potash Co., New York City...2nd Cover
Utility Works, The, East Point, Ga.....—
Virginia-Carolina Chemical Corp., Richmond, Va.....23
Wiley & Company, Inc., Baltimore, Md.....34

FEEDING AND FERTILIZER MATERIALS

(SINCE 1898)

SAMUEL D. KEIM
1343 ARCH STREET
PHILADELPHIA 7, PA.

MONARCH SPRAYS



This is our Fig. 645 Nozzle. Used for Scrubbing Acid Phosphate Gases. Made for "full" or "hollow" cone in Brass and "Everdur." We also make "Non-Clog" Nozzles in Brass and Steel, and Stoneware Chamber Sprays now used by nearly all chamber spray sulphuric acid plants.

CATALOG 6-C

MONARCH MFG. WORKS, INC.

Westmoreland and Emery Sts., Philadelphia, Pa.

HAYWARD BUCKETS



Use this Hayward Class "K" Clam Shell for severe superphosphate digging and handling.

THE HAYWARD CO., 202 Fulton St., New York



GASCOYNE & CO., INC.

Established 1887

Chemists and Assayers

Public Weighers and Samplers

27 South Gay Street - BALTIMORE, MD.

SHUEY & COMPANY, Inc.

Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Chemists for Florida Hard Rock Phosphate Export Association. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemists for National Cottonseed Products Association

115 E. BAYSTREET, SAVANNAH, GA.

H. D. RUHM

Phosphate Consultant

305 W. 7th Street

COLUMBIA

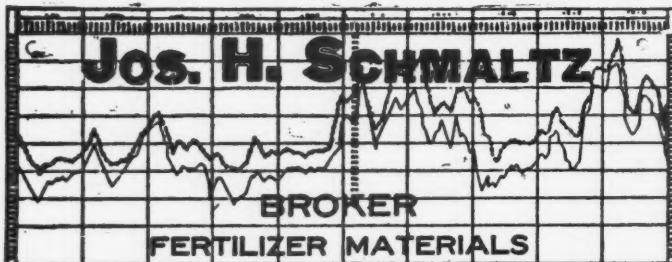
TENNESSEE

WILEY & COMPANY, Inc.

Analytical and Consulting Chemists

BALTIMORE 2, MD.

Tankage
Blood
Bone
All
Ammoniates



327
South
La Salle
Street
CHICAGO

IT'S THE SIMPLEST THING IN THE WORLD

to find the desired per cent of constituent in complete fertilizers, if you have the

ADAMS' POCKET FORMULA RULE

You get the information at a glance. Hundreds of fertilizer men carry the Adams' Rule. It takes up no more space than an average envelope. Price \$1.25.

PLEASE REMIT WITH ORDER

WARE BROS. COMPANY

SOLE DISTRIBUTORS
1900 CHESTNUT STREET, PHILA. 3



PCA's RED INDIAN

*makes heap
big hustle*

The farmer is aware of the potash need of his soil, as never before.

That speaks well for the future of your business and ours though it creates its immediate problems.

To meet these problems PCA is making "heap big hustle" in every possible way. We'd like to ship you every ton of high grade Muriate you'd like to have, but you know the complications as well as we do. Please be assured, however, that this company is doing its utmost to render the best possible service to you today...that is always PCA's objective.



POTASH COMPANY OF AMERICA

CARLSBAD, NEW MEXICO

GENERAL SALES OFFICE . 50 Broadway, New York, N. Y. • MIDWESTERN SALES OFFICE . . First National Bank Bldg.. Peoria, Ill.
SOUTHERN SALES OFFICE . . Candler Building Atlanta, Ga.



*Sure, Farmers
are Using
this Combination*

Sul-Po-Mag

WATER-SOLUBLE
SULPHATE OF POTASH-MAGNESIA

You can get quick-acting, water-soluble magnesia in the most practical and economical way by using Sul-Po-Mag in your fertilizer mixtures or for direct application. This natural combination of vital plant foods is being produced by International in increasing quantities in the effort to keep pace with the rapidly growing demand for use on a wide variety of crops. Sul-Po-Mag is produced in the form of dry, free-flowing crystals in a mechanical condition that assures easy, time-saving handling from car or storage.



SUL-PO-MAG (WATER-SOLUBLE
SULPHATE OF POTASH-MAGNESIA)

**MURIATE OF POTASH
SULPHATE OF POTASH**

International



MINERALS & CHEMICAL CORPORATION

General Offices: 20 NORTH WACKER DRIVE • CHICAGO 6

DISTRICT SALES OFFICES: 61 BROADWAY, NEW YORK, N. Y. • CHICAGO • VOLUNTEER BLDG., ATLANTA, GA

NESIN

WU

WU

cation
of vita
ced by
quanti
ce with
nd for
crops
in the
crystal
n the
g han

LE
(A)

H
H

ION

A, GA